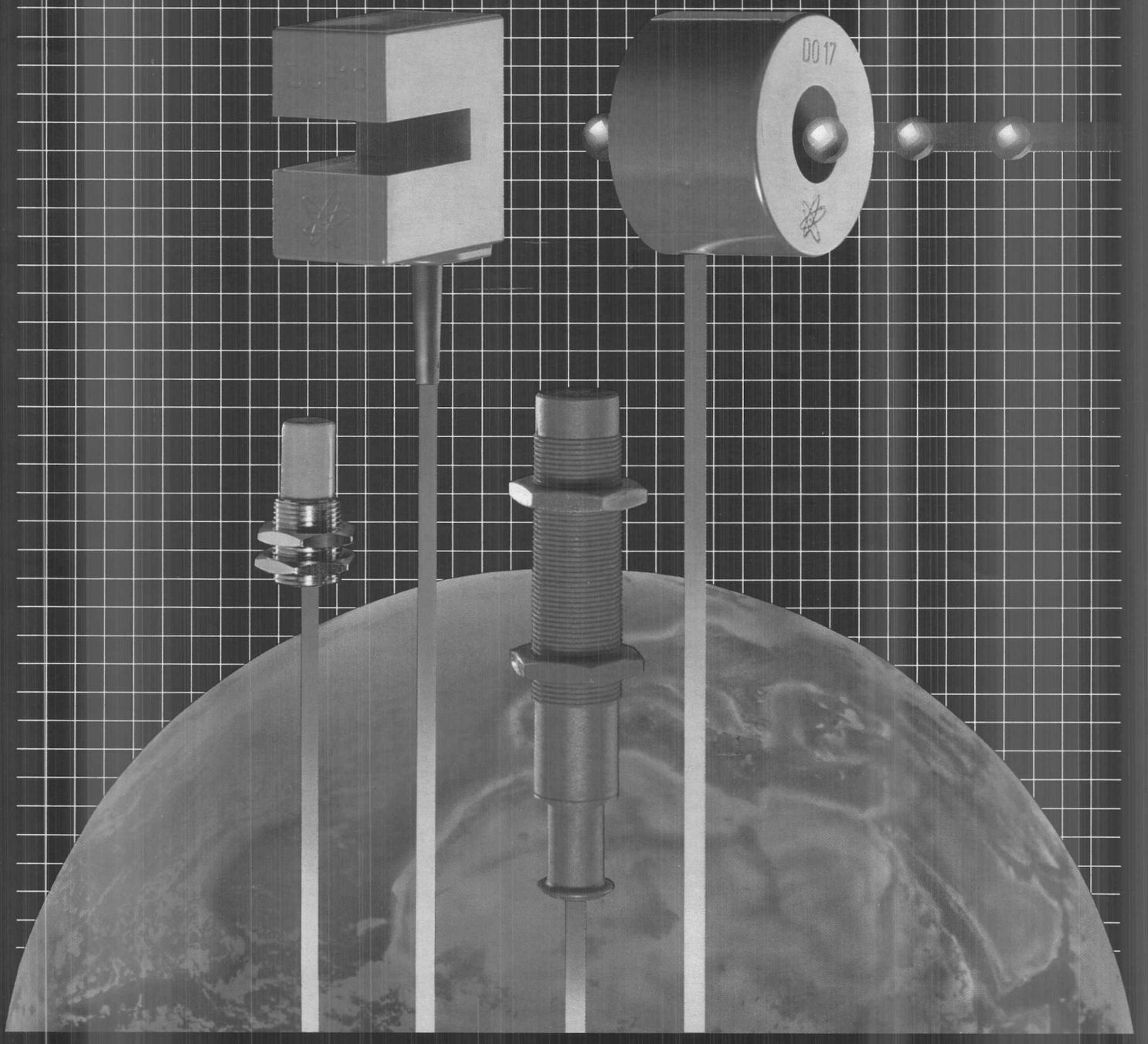
INDUCTIVE· SENSORS

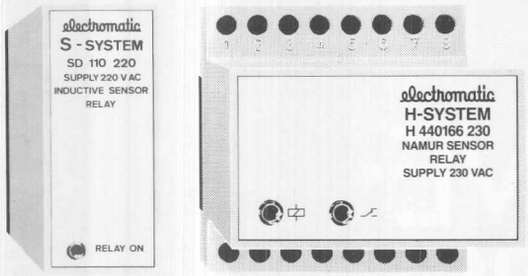
electromatic

Proximity-Switches-
Amplifiers



BELGIUM . BUNDESREPUBLIK DEUTSCHLAND . CANADA . DANMARK . EIRE . ESPAÑA . FINLAND . FRANCE . ITALIA
MALTA . NEDERLAND . NORGE . PORTUGAL . SCHWEIZ . SVERIGE . UNITED KINGDOM . UNITED STATES . ÖSTERREICH

Namur sensor system



SD 170/SD 270

- Set-Reset relay for 2 inductive or capacitive sensors without amplifier. (NAMUR/DIN 19234).
- 10 A SPDT or 8 DPDT output relay.
- LED-indication: relay on.
- AC or DC power supply.

SD 110/SD 210/H 440

- Relay for inductive and capacitive sensors without amplifier (NAMUR/DIN 19234).
- Relay locks in OFF-position at cable failures.
- 10 A SPDT or 8 A DPDT output relay.
- LED-indications: relay and power supply on.
- AC or DC power supply.

THE S-SYSTEM/H-SYSTEM

The S-system/H-system is made in accordance with the NAMUR/DIN 19234 norm.
The sensor current must be below 1 mA when activated and above 2.2 mA when not activated.

SD 170/SD 270
The system detects changes in current, and the relay operates immediately. The system is a SET-RESET type in which the first sensor activates the relay and the second sensor releases the relay. Reset has priority.

SD 110/SD 210/H 440
The system detects changes in current, and the relay operates immediately. The system can operate as normally open or normally closed depending on to which pins the sensor is connected.

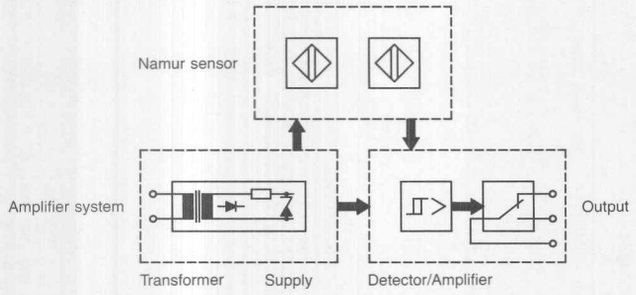
Mode of operation:
Example 1
The relay operates on activation of the sensor.
It releases automatically in case of interruption or short-circuit of the sensor or cable.

Example 2
The relay releases on activation of the sensor or interruption of the cable. The relay activates in case of sensor or cable short-circuit.

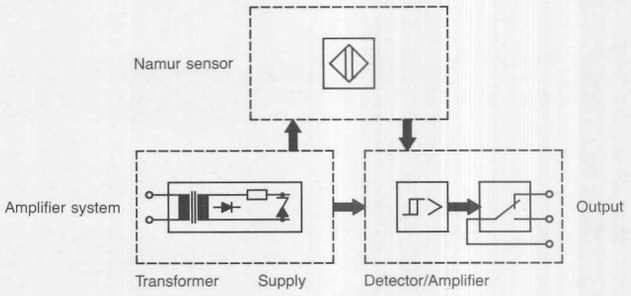
Features
Easy to install.
No special cable requirements due to DC current between system and sensor.
No adjustments.
The sensors are supplied from the S-system/H-system.

See S-system catalogue and H-system datasheet for further specifications.

DESIGN PRINCIPLES



SD 170/SD 270



SD 110/SD 210/H 440

TECHNICAL SPECIFICATIONS

Sensor voltage
H-system
Terminals 5-7 or 6-7:
8 VDC/ 1 KΩ.
Terminal 7 positive.

S-system
Pins 5-6 or 6-7:
8 VDC/1 KΩ.
(8 VDC/620 Ω
for SD 170/270.)
Pin 6 positive.

Short-circuit current
Max. 8 mA.
(Max. 13 mA for SD 170/270.)

Sensor current
Activated: < 1 mA.
Not activated: > 2.2 mA.

Trigger point:
ON: 1.6 mA (typically).
OFF: 1.7 mA (typically).

Hysteresis:
Approx. 0.1 mA.

Sensing distance
See sensor specifications.

Sensing frequency
Max. 10 operations/sec.

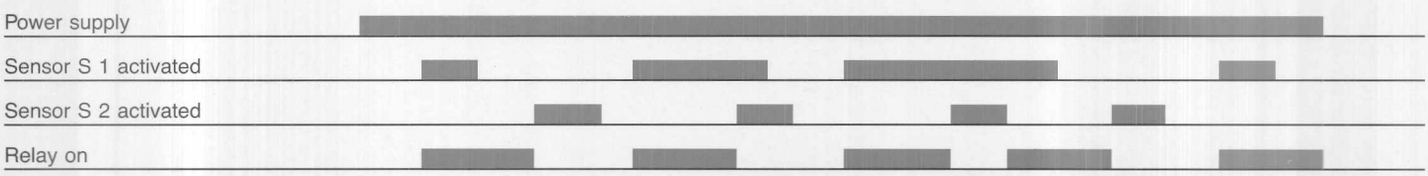
Pulse time
Min. 20 ms.

Ordering key
H-system: terminal connections.
H 440 166 xxx = 8 A DPDT
S-system: 11-pin circular plug.
SD 110 xxx/SD 170 xxx = 10 A SPDT.
SD 210 xxx/SD 270 xxx = 8 A DPDT.

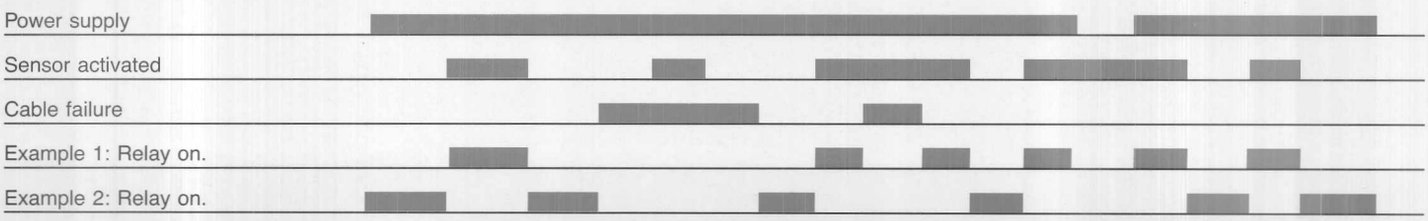
xxx = power supply
024 = 24 VAC ±15%
115 = 115 VAC ±15%
230 = 230 VAC ±15%
724 = 24 VDC ±15%
(DC only S-system).

OPERATION DIAGRAMS

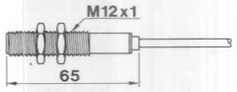
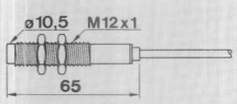
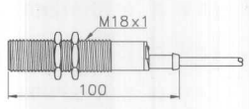
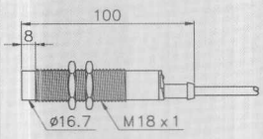
SD 170/SD 270



SD 110/SD 210/H 440



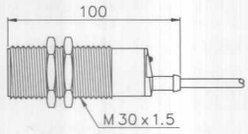
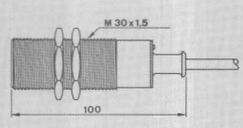
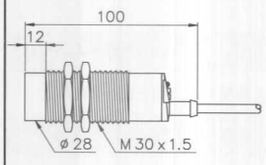
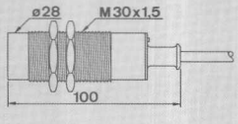
Euronorm inductive sensors

Dimensions	Nominal sens. dist. mm	Usable sens. dist mm	Hysteresis max. mm	Repeatability deviation, max %	Namur	NPN	PNP	SCR	Power supply	Load, mA	Current consumption max. mA at nominal power supply	2 m cable	Imp/sec	Short-circuit safe	LED-indication	For building-in	Voltage drop	Wiring diagram	Type no.
Polyester housing																			
	2	0-1.6	0.33	10	NC				8.2 VDC/1 KΩ			+	1500	–	–	+		A	EI 1202 NACP
	2	0-1.6	0.33	10		NO			10-40 VDC	0-200	7	+	800	–	+	+	≤1.5 V	B	EI 1202 NNOP
	2	0-1.6	0.33	10		NC			10-40 VDC	0-200	7	+	800	–	+	+	≤1.5 V	C	EI 1202 NNCP
	2	0-1.6	0.33	10			NO		10-40 VDC	0-200	7	+	800	–	+	+	≤1.5 V	D	EI 1202 PNOP
	2	0-1.6	0.33	10			NC		10-40 VDC	0-200	7	+	800	–	+	+	≤1.5 V	E	EI 1202 PNCP
	4	0-3.2	0.66	10	NC				8.2 VDC/1 KΩ			+	1000	–	–	–		A	EI 1204 NACP
	4	0-3.2	0.66	10		NO			10-40 VDC	0-200	7	+	100	–	+	–	≤1.5 V	B	EI 1204 NNOP
	4	0-3.2	0.66	10		NC			10-40 VDC	0-200	7	+	100	–	+	–	≤1.5 V	C	EI 1204 NNCP
	4	0-3.2	0.66	10			NO		10-40 VDC	0-200	7	+	100	–	+	–	≤1.5 V	D	EI 1204 PNOP
	4	0-3.2	0.66	10			NC		10-40 VDC	0-200	7	+	100	–	+	–	≤1.5 V	E	EI 1204 PNCP
	5	0-4.0	0.83	5	NC				8.2 VDC/1 KΩ			+	500	–	–	+		A	EI 1805 NACP
	5	0-4.0	0.83	5		NO			10-40 VDC	0-200	7	+	200	–	+	+	≤1.5 V	B	EI 1805 NNOP
	5	0-4.0	0.83	5		NC			10-40 VDC	0-200	7	+	200	–	+	+	≤1.5 V	C	EI 1805 NNCP
	5	0-4.0	0.83	5			NO		10-40 VDC	0-200	7	+	200	–	+	+	≤1.5 V	D	EI 1805 PNOP
	5	0-4.0	0.83	5			NC		10-40 VDC	0-200	7	+	200	–	+	+	≤1.5 V	E	EI 1805 PNCP
	5	0-4.0	1.1	5				NO	20-265 VAC	20-500	Leak ≤3	+	25	–	+	+	≤10 V	H	EI 1805 TBOP
	5	0-4.0	1.1	5				NC	20-265 VAC	20-500	Leak ≤3	+	25	–	+	+	≤10 V	J	EI 1805 TBCP
	8	0-6.5	1.32	5		NO			10-40 VDC	0-200	7	+	80	–	+	–	≤1.5 V	B	EI 1808 NNOP
	8	0-6.5	1.32	5		NC			10-40 VDC	0-200	7	+	80	–	+	–	≤1.5 V	C	EI 1808 NNCP
	8	0-6.5	1.32	5			NO		10-40 VDC	0-200	7	+	80	–	+	–	≤1.5 V	D	EI 1808 PNOP
	8	0-6.5	1.32	5			NC		10-40 VDC	0-200	7	+	80	–	+	–	≤1.5 V	E	EI 1808 PNCP
	8	0-6.5	1.76	5				NO	20-265 VAC	20-500	Leak ≤3	+	25	–	+	–	≤10 V	H	EI 1808 TBOP
	8	0-6.5	1.76	5				NC	20-265 VAC	20-500	Leak ≤3	+	25	–	+	–	≤10 V	J	EI 1808 TBCP

Ambient temperature: −25 to +70°C.
Proofness: IP 67.

Euronorm inductive sensors

Polyester housing

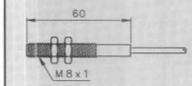
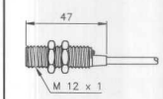
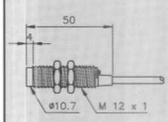
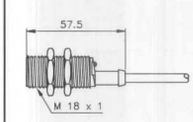
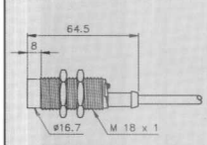
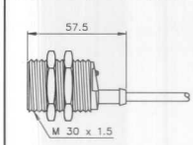
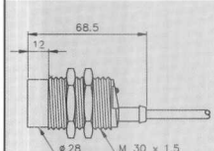
Dimensions	Nominal sens. dist. mm	Usable sens. dist. mm	Hysteresis max. mm	Repeatability deviation, max %	Namur	NPN	PNP	SCR	Relay	Power supply	Load, mA	Current consumption, max. mA at nominal power supply	2 m cable	Imp/sec	Short-circuit safe	LED-indication	For building-in	Voltage drop	Wiring diagram	Type no.
	10	0-8.1	1.65	5	NC					8.2 VDC/1 KΩ			+	500	–	–	+		A	EI 3010 NACP
	10	0-8.1	1.65	5		NO				10-40 VDC	0-200	7	+	100	–	+	+	≤1.5 V	B	EI 3010 NNOP
	10	0-8.1	1.65	5		NC				10-40 VDC	0-200	7	+	100	–	+	+	≤1.5 V	C	EI 3010 NNCP
	10	0-8.1	1.65	5			NO			10-40 VDC	0-200	7	+	100	–	+	+	≤1.5 V	D	EI 3010 PNOP
	10	0-8.1	1.65	5			NC			10-40 VDC	0-200	7	+	100	–	+	+	≤1.5 V	E	EI 3010 PNCP
	10	0-8.1	2.2	5				NO		20-265 VAC	20-500	Leak ≤3	+	25	–	+	+	≤10 V	H	EI 3010 TBOP
	10	0-8.1	2.2	5				NC		20-265 VAC	20-500	Leak ≤3	+	25	–	+	+	≤10 V	J	EI 3010 TBCP
	10	0-8.1	1.7	5					NO/ NC	10.8-13.2 V AC/DC	0-2 A	65 mA @ AC 35 mA @ DC	+	10	–	+	+	0 V	L	EI 3010 RNAP912
	10	0-8.1	1.7	5					NO/ NC	21.6-26.2 V AC/DC	0-2 A	34 mA @ AC 13 mA @ DC	+	10	–	+	+	0 V	L	EI 3010 RNAP924
	10	0-8.1	1.7	5					NO/ NC	207-250 V AC	0-2 A	16 mA	+	10	–	+	+	0 V	L	EI 3010 RNAP230
	15	0-12.1	2.48	5	NC					8.2 VDC/1 KΩ			+	200	–	–	–		A	EI 3015 NACP
	15	0-12.1	2.48	5		NO				10-40 VDC	0-200	7	+	40	–	+	–	≤1.5 V	B	EI 3015 NNOP
	15	0-12.1	2.48	5		NC				10-40 VDC	0-200	7	+	40	–	+	–	≤1.5 V	C	EI 3015 NNCP
	15	0-12.1	2.48	5			NO			10-40 VDC	0-200	7	+	40	–	+	–	≤1.5 V	D	EI 3015 PNOP
	15	0-12.1	2.48	5			NC			10-40 VDC	0-200	7	+	40	–	+	–	≤1.5 V	E	EI 3015 PNCP
	15	0-12.1	3.3	5				NO		20-265 VAC	20-500	Leak ≤3	+	25	–	+	–	≤10 V	H	EI 3015 TBOP
	15	0-12.1	3.3	5				NC		20-265 VAC	20-500	Leak ≤3	+	25	–	+	–	≤10 V	J	EI 3015 TBCP
	15	0-12.1	2.5	5					NO/ NC	10.8-13.2 V AC/DC	0-2 A	65 mA @ AC 35 mA @ DC	+	10	–	+	–	0 V	L	EI 3015 RNAP912
	15	0-12.1	2.5	5					NO/ NC	21.6-26.2 V AC/DC	0-2 A	34 mA @ AC 13 mA @ DC	+	10	–	+	–	0 V	L	EI 3015 RNAP924
	15	0-12.1	2.5	5					NO/ NC	207-250 V AC	0-2 A	16 mA	+	10	–	+	–	0 V	L	EI 3015 RNAP230

Ambient temperature −25 to + 70°C.

Proofness: IP 67.

Euronorm inductive sensors

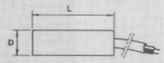
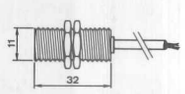
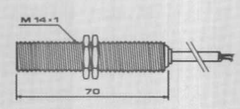
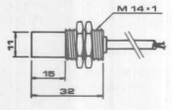
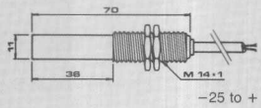
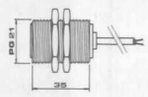
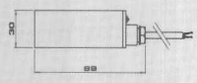
Metal housing

Dimensions	Nominal sens. dist. mm	Usable sens. dist. mm	Hysteresis max. mm	Repeatability deviation, max. %	Namur	NPN	PNP	SCR	Power supply	Load, mA	Current consumption, max. mA at nominal power supply	2 m cable	Polarity protected	Imp/sec	Short-circuit safe	LED-indication	For building-in	Voltage drop	Wiring diagram	Type no.
	1	0-0.6	0.3	10		NO			10-30 VDC	0-80 at 10 VDC	20	+		1000			+	≤0.3 V	B	EI 0801 NNOM
	1	0-0.6	0.3	10			NO		10-30 VDC	0-200 at 30 VDC	20	+		1000			+	≤0.3 V	D	EI 0801 PNOM
	2	1.62		10	NC				8.2 V/1 KΩ			+	+	800			+		A	EI 1202 NACM-S
	2	1.62	0.33	10		NO			10-40 VDC	0-200	9	+	+	800	+	+	+	≤2.5 V	F	EI 1202 NPOM-S
	2	1.62	0.33	10			NO		10-40 VDC	0-200	9	+	+	800	+	+	+	≤2.5 V	G	EI 1202 PPOM-S
	4	3.24		10	NC				8.2 V/1 KΩ			+	+	400					A	EI 1204 NACM-S
	4	3.24	0.66	10		NO			10-40 VDC	0-200	9	+	+	100	+	+		≤2.5 V	F	EI 1204 NPOM-S
	4	3.24	0.66	10			NO		10-40 VDC	0-200	9	+	+	100	+	+		≤2.5 V	G	EI 1204 PPOM-S
	5	4.05		5	NC				8.2 V/1 KΩ			+	+	500			+		A	EI 1805 NACM-S
	5	4.05	0.83	5		NO			10-40 VDC	0-200	9	+	+	250	+	+	+	≤2.5 V	F	EI 1805 NPOM-S
	5	4.05	0.83	5			NO		10-40 VDC	0-200	9	+	+	250	+	+	+	≤2.5 V	G	EI 1805 PPOM-S
	5	4.05	1.1	5				NO	90-250 VAC	8-200	Leak ≤2.2	+		25		+	+	≤10 V	H	EI 1805 TBOM-S
	5	4.05	1.1	5				NC	90-250 VAC	8-200	Leak ≤2.2	+		25		+	+	≤10 V	J	EI 1805 TBCM-S
	8	6.48		5	NC				8.2 V/1 KΩ			+	+	200					A	EI 1808 NACM-S
	8	6.48	1.32	5		NO			10-40 VDC	0-200	9	+	+	100	+	+		≤2.5 V	F	EI 1808 NPOM-S
	8	6.48	1.32	5			NO		10-40 VDC	0-200	9	+	+	100	+	+		≤2.5 V	G	EI 1808 PPOM-S
	8	6.48	1.76	5				NO	90-250 VAC	8-200	Leak ≤2.2	+		25		+		≤10 V	H	EI 1808 TBOM-S
	8	6.48	1.76	5				NC	90-250 VAC	8-200	Leak ≤2.2	+		25		+		≤10 V	J	EI 1808 TBCM-S
	10	8.1		5	NC				8.2 V/1 KΩ			+	+	300			+		A	EI 3010 NACM-S
	10	8.1	1.65	5		NO			10-40 VDC	0-200	9	+	+	150	+	+	+	≤2.5 V	F	EI 3010 NPOM-S
	10	8.1	1.65	5			NO		10-40 VDC	0-200	9	+	+	150	+	+	+	≤2.5 V	G	EI 3010 PPOM-S
	10	8.1	2.2	5				NO	90-250 VAC	8-200	Leak ≤2.2	+		25		+	+	≤10 V	H	EI 3010 TBOM-S
	10	8.1	2.2	5				NC	90-250 VAC	8-200	Leak ≤2.2	+		25		+	+	≤10 V	J	EI 3010 TBCM-S
	15	12.15		5	NC				8.2 V/1 KΩ			+	+	100					A	EI 3015 NACM-S
	15	12.15	2.48	5		NO			10-40 VDC	0-200	9	+	+	50	+	+		≤2.5 V	F	EI 3015 NPOM-S
	15	12.15	2.48	5			NO		10-40 VDC	0-200	9	+	+	50	+	+		≤2.5 V	G	EI 3015 PPOM-S
	15	12.15	3.3	5				NO	90-250 VAC	8-200	Leak ≤2.2	+		25		+		≤10 V	H	EI 3015 TBOM-S
	15	12.15	3.3	5				NC	90-250 VAC	8-200	Leak ≤2.2	+		25		+		≤10 V	J	EI 3015 TBCM-S

Ambient temperature: −25 to + 70°C.

Proofness: IP 67.

Inductive sensors

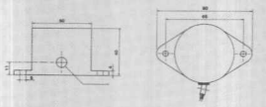
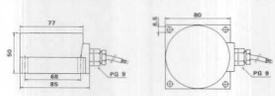
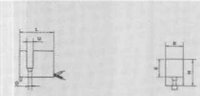
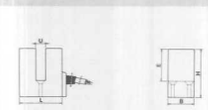
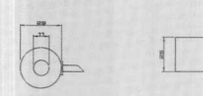
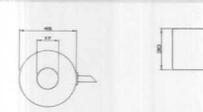
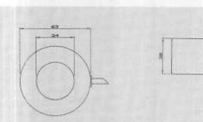
Dimensions	Nominal sens. dist. mm	Usable sens. dist mm	Hysteresis max. mm	Namur	NPN	Power supply	Load, mA	Current consumption, mA	2 m cable	Imp/sec	Short-circuit safe	R leak, KΩ	For building-in	Voltage drop max. @ 200 mA	Wiring diagram	Type no.
ABS housing																
	0.5	0.35	0.2	NC		8.2 VDC/1 KΩ			+	2000	–		+		A	DJ 0.5
	1.0	0.7	0.4	NC		8.2 VDC/1 KΩ			+	2000	–		–		A	DJ 1
	2.0	1.4	0.4	NC		8.2 VDC/1 KΩ			+	2000	–		+		A	DJ 2
–25 to +70°C (only DJ 5)	5.0	4.0	0.35	NC		8.2 VDC/1 KΩ			+	1000	–		–		A	DJ 5
	2.0	1.4	0.4	NC		8.2 VDC/1 KΩ			+	2000	–		+		A	DJ 2 G*
	2.0	1.4	0.4		NO	24 VDC ±10%	0-200	15	+	2000	–	100	+	0.7	K	DJ 2 GE*
 –25 to + 70°C	5.0	4.0	0.35	NC		8.2 VDC/1 KΩ			+	1000	–		–		A	DJ 5 G*
 –25 to + 70°C	5.0	3.5	0.4		NO	24 VDC ±10%	0-200	15	+	1000	–	100	–	0.7	K	DJ 5 GE*
	6.0	4.2	0.4	NC		8.2 VDC/1 KΩ			+	1000	–		+		A	DJ 6 G*
	6.0	4.8	1.0		NO	24 VDC ±20%	0-200	10	+	500	–		+	1.5	B	DJ 6 GE*
	10.0	7.0	0.6	NC		8.2 VDC/1 KΩ			+	400	–		+		A	DJ 10

Ambient temperature: –20 to +60°C.
Proofness: IP 67.
*Thread: Nickel-plated brass.
DJ 5, DJ 5 G, DJ 6 GE and DJ 40 E are protected.

Type	L	D
DJ 0.5/DJ 1	21	6.5
DJ 2	32	11
DJ 5	32	11

Inductive sensors

ABS housing

Dimensions	Nominal sens. dist mm	Usable sens. dist.mm	Hysteresis max. mm	Namur	NPN	Power supply	Load, mA	Current consumption, mA	2 m cable	Imp/sec	Short-circuit safe	R Leak, KΩ	For building-in	Wiring diagram	Voltage drop max. @ 200 mA	Type no.
	25	18	3	NC		8.2 VDC/1 KΩ			+	250	–		–	A		DJ 25
	25	18	3		NO	24 VDC ±10%	0-200	15	+	200	–	39	–	K	0.7	DJ 25 E
	40	28.8	5	NC		8.2 VDC/1 KΩ			+	100	–		–	A		DJ 40
	40	32	5		NO	24 VDC ±20%	0-200	10	+	100	–		–	B	1.5	DJ 40 E
	3.5*		0.3	NC		8.2 VDC/1 KΩ			+	2000	–		–	A		DU 3.5
	5.0*		0.6	NC		8.2 VDC/1 KΩ			+	1500	–		–	A		DU 5
	6.0*		0.3	NC		8.2 VDC/1 KΩ			+	2000	–		–	A		DU 6
	6.0*		0.3		NO	24 VDC ±10%	0-200	15	+	2000	–	100	–	K	1.5	DU 6 E
	10*		0.5	NC		8.2 VDC/1 KΩ			+	1000	–		–	A		DU 10
	10*		0.5		NO	24 VDC ±10%	0-200	15	+	1000	–	100	–	K	0.7	DU 10 E
	11**		0.3	NC		8.2 VDC/1 KΩ			+	2000	–		–	A		DO 11
	17**		0.3	NC		8.2 VDC/1 KΩ			+	1000	–		–	A		DO 17
	17**		0.3		NO	24 VDC ±10%	0-200	15	+	1000	–	100	–	K	0.7	DO 17 E
	34**		0.3	NC		8.2 VDC/1 KΩ			+	1000	–		–	A		DO 34
	34**		0.3		NO	24 VDC ±10%	0-200	15	+	1000	–	100	–	K	0.7	DO 34 E

Ambient temperature: −20 to +60°C.
Proofness: IP 67.

* Sensing gap.
** Sensing diameter.

Type	U	L	H	B	E
DU 6/6E	6	26	30	16	20
DU 10/10E	10	44	45	25	32

Type	U	L	H	B	D	E
DU 3.5	3.5	19	15	10	1.9	10
DU 5	5	19	15	10	1.9	10

Other sensors are available on request.

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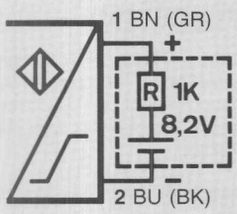
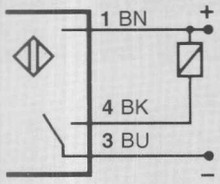
Wiring diagrams

A



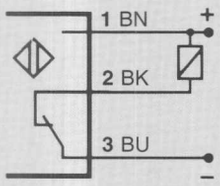
NAC

B



NNO

C



NNC

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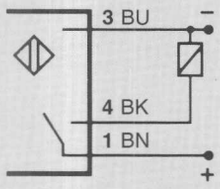
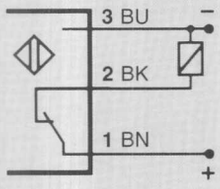


PNO

E



PNC

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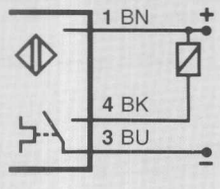
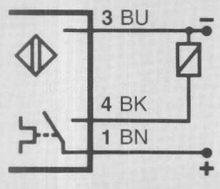


NPO

G



PPO

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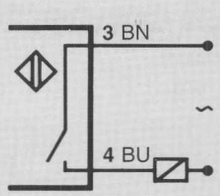
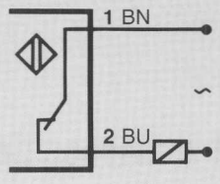


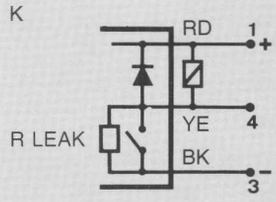
TBO

J



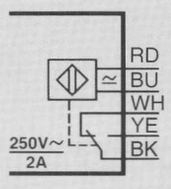
TBC

K



E

L

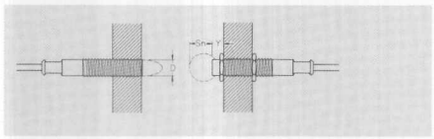


RNA

Applications

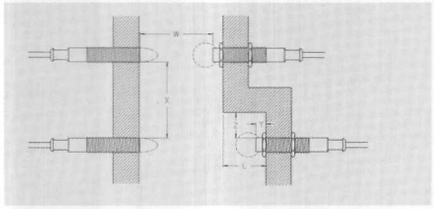
Building-in

Flush-mounting Partial Flush-mounting



No clearance needed– a shielded sensor can be mounted.

A non-shielded sensor must provide clearance equal to 2 × Sn.



Sensor mounting considerations when using more than one sensor.

Flush mounting:
W must be 6 X "S"
X must be 1 X "D"
Z must be 1 X "D"
Y can be flush-mounted.

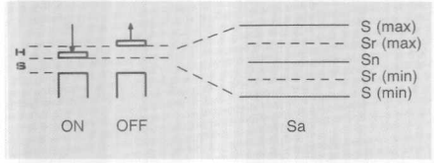
Partial flush-mounting:
W must be 6 X "S"
X must be 2 X "D"
Y must be 2 X Sn
Z must be 2 X "D"
if L ≥ Y.
Z must be 1 X "D"
if L ≤ Y.

Nominal sensing distance

H: Hysteresis Sn: Nominal sensing distance

Sr: Manufacturing margin

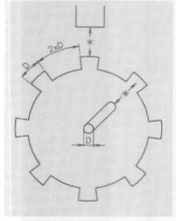
S: Effective sensing distance (at max. temperature and voltage variations)



Usable sensing distance Sa: < S (min.)

Sensing frequency

Euronorm



The sensing frequency is measured at ½ × nominal sensing distance (Sn/2).

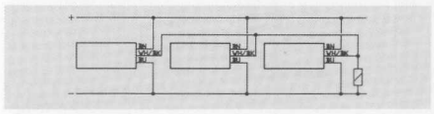
Namur

In accordance with DIN 19234
Unactivated > 3 mA (2.2 mA)
Activated < 1 mA
7.7 to 9 VDC/550 to 1050 Ω.

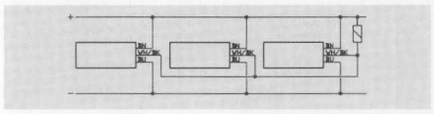
Parallel connections

(logic OR function)

Sensors with PNP



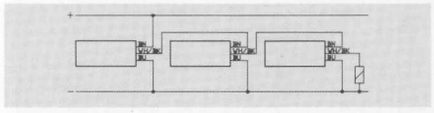
Sensors with NPN



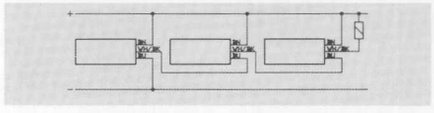
Serial connections

(logic AND function)

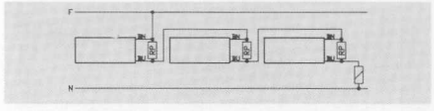
Sensors with PNP



Sensors with NPN



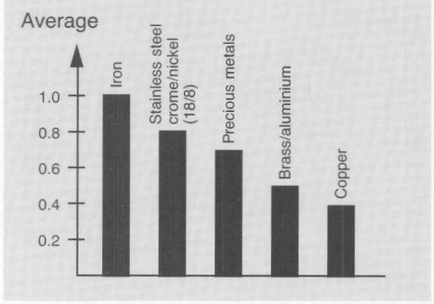
Sensors with SCR



Be sure that the total leakage current does not disturb the function of the load.

Be sure that the total voltage drop across the sensors at small power supply voltages does not result in a too low load voltage.
Due to tolerances in leakage currents it may be necessary to mount parallel resistors across the sensors. The size depends on the conditions. It is recommended that only sensors in Euronorm housing are coupled in series or in parallel.

Reduction factors



Ripple

For Euronorm sensors with amplifier (transistor output).
The sensors can be connected to a supply with a maximum ripple of 30 VDC (20 VDC), i.e. the power supply must never get below 10 V or exceed 40 V (30 V). Ripple voltage must be less than 10% of the power supply.

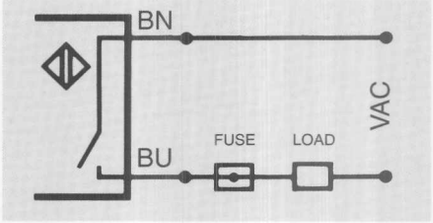
Polarization

The Euronorm sensors are not damaged by wrong polarization of the power supply, but proper function implies correct polarization.
Namur sensors in polyester housing are not polarity protected.

No freewheeling diode is needed at small inductive loads.

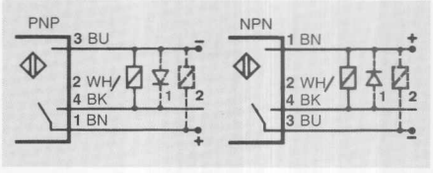
Installation guide for sensors with SCR output

Load description	Comments	Max. allowable current
Ohmic	No external protection needed	Nominal I_o RMS
Inductive	Note that by heavy inductive loads in-rush currents must be limited to 5 × I_o RMS for 20 ms.	Nominal I_o RMS
Filament lamps	Due to 5-10 × current by switching on.	Max. 0.5 × I_o RMS
	Fuse recommended due to higher current at running out at filament life time end.	Max. fuse 0.5 × I_o RMS
		Selection of type: I^2t see data sheet on fuse (normally type ultrafast (superfast)).
Fuses are generally recommended if short circuit (or partial short circuit) of the load may occur. Otherwise the output switching element will be destroyed.		



In connection with most ohmic and inductive loads no additional protection is required.
The use of great loads or starting currents may necessitate complete or partial protection of the installation.
A detailed installation guide goes with each sensor.

Installation guide for 3/4-wire sensors



When long power supply cables are used, it is advantageous to use diode (1) and varistor (2) as protection.